*Article*

# Epidemiological study of scabies among school going children in district Haripur, Pakistan

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## Abstract

Scabies is a parasitic skin infestation caused by the burrowing mite *Sarcoptes scabiei*. An epidemiological study of scabies was conducted at Haripur from Jan to April 2013 to evaluate the prevalence and the important risk factors for the spread of scabies. The study was conducted in School children. Diagnosis was based on the presence of active burrows or excessive rash (rubbing). Out of a sample of 968 school children ($1^{st}$-$5^{th}$) 40 were detected as scabetic yielding a prevalence rate of 4.13%. Selecting 70 children as control, a case-control study was performed to assess the relative risk of scabies with respect to a variety of risk factors. Sleeping behavior (bed sharing) and the presence of head lice came out as a significant risk factors with relative risk of 3.0 and 2.44, respectively. On the other hand, factors like family size, house characteristics, general health condition, and bathing frequency did not significantly influence the occurrence of scabies.

**Keywords** scabies; epidemiology; Pakistan.

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## 1 Introduction

Human scabies is a contagious disease transmitted mainlyby person-to-person contact and is caused by a tiny mite *Sarcoptes scabiei* variety hominis (Acarina: Sarcoptidae) that threatens globally human health (Chen et al., 2014). Scabies causes itching, pruritic skin rashes and due to subsequent scratching, leads to secondary bacterial infection like Streptococcus pyogenes and Staphylococcus aureus; cause acute glomerulonephritis, septicaemia and rheumatic heart disease (Romani et al., 2015). According to recent research scabies is perfectly and exactly diagnosis by the more confirming methods like dermoscopy or adhesive tape test to reduce the chances of false-negative results (Nazari and Azizi, 2014).This disease is worldwide in distribution and mostly endemic with high prevalence in resource-poor urban and rural communities of developing

countries because of its improper management, and poverty leading overcrowding (Licina et al., 2014; Nazariand Azizi, 2014). Among different communities' different epidemiological distribution are reported for the scabies;however, the highest rate is found in Pacific Island countries and in many other tropical countries including in Africa (Haar et al., 2014; Romani et al., 2015). The lowest prevalence rate for this skin disease is recorded in Western Europe (Hay et al., 2014). Globally, the prevalence rate of scabies ranged from 0.2% to 71.4% (Romani et al., 2015) All humans are susceptible to Scabies; however, the transmission is more often in children and immune suppressed persons (Heukelbach et al., 2013). Samina et al. (2016) reported 109 cases were detected from district Haripur Pakistan, out of these total samples of 1193 individuals, exhibiting a prevalence rate of 9.13%. The disease was significantly more common in females (10.4%) than males (7.9%), in lower socio-economic classes (13.8%) than the upper and middle classes (5.22%, 7.16%), in those living in uncemented houses (23.6%) than those living in cemented houses (7.5%), and in those having domestic animals at home (13.4%) than those without domestic animals (8.08%). The disease is known to be quite prevalent throughout Pakistan. Several scabies epidemiological studies have been carried out in different areas of Pakistan; reports available are Bilquees, 1995; Anwar et al., 2006; Zeba et al., 2012; Qasim, 2015; but the epidemiological data from many areas is still missing. The present study was carried out to evaluate an epidemiological study of scabies in humans at District Haripur.

## 2 Materials and Methods

### 2.1 Study area

The survey for the prevalence of scabies was conducted in school going children of district Haripur.

### 2.2 Diagnosis

Diagnosis of scabies is confirmed on the presence of burrows, extraction of mite or egg from burrow at the typical site of lesion (Khan et al, 1992). In this study diagnosis was made on the presence of active burrows or those transformed into lesions due to secondary bacterial infection or excessive rash (Rubbing). In an attempt to obtain *Sarcoptes scabiei*, a number of smears were made both from the school children and general population. For preparation of smear following method was adopted. A burrow was opened with a straight cutting surgical needle and then scrapped longitudinally with a sharp border of a lancet. The material thus obtained was mounted on a glass slide with a drop of mounted MEDIA (Koh + Glycerin 1:1) and examined under low power microscope. A total of 70 slides were examined (30 from school children and 40 from general population).

## 3 Results

### 3.1 Scabies in school children

Class-wise breakup ofthe total number of students in primary section of six school surveyed is shown in Table 1.

### 3.2 Scabies in relation to family size

Table 2 shows 40 scabies cases diagnosed in the students a class 1-5$^{th}$ and 70 controls. To analyze the prevalence of scabies in relation to family size, the subject was divided into two categories: those having $\geq$ seven individuals per family and those having $\leq$ six individuals per family. Relative risk of large family size was only 1.2, which was negligible. a low $\chi^2$ value also indicated no significant difference ($\chi^2 = 0.008$; df =1; P> 0.05).

**Table 1** Total enrolment of students in primary section of six schools surveyed by class. Figures in parenthesis represent the children suffering from scabies.

| | School Name | Class | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Telecom Boys Public School | 25 (0) | 36 (02) | 28 (02) | 26 (0) | 45 (01) | 160 (05) |
| 2 | Telecom Girls Public School | 49 (0) | 28 (0) | 38 (01) | 30 (01) | 20 (01) | 165 (03) |
| 3 | Muslim Public School | 25 (01) | 24 (01) | 23 (01) | 9 (0) | 2 (0) | 83 (03) |
| 4 | Dalda Welfare Public School | 48 (01) | 39 (01) | 51 (01) | 50 (01) | 37 (0) | 225 (04) |
| 5 | Telecom Boys High School | 52 (04) | 28 (03) | 25 (04) | 34 (04) | 45 (02) | 184 (17) |
| 6 | Telecom Girls High School | 38 (04) | 29 (0) | 30 (0) | 34 (05) | 20 (0) | 151 (09) |
| | Total | 237 (10) | 184 (07) | 195 (09) | 183 (11) | 169 (04) | 968 (40) |

**Table 2** Scabies in relation to family size.

| Family Size | Case | Control | Total |
|---|---|---|---|
| ≥ 7 | 21(A) | 36(B) | 57(A+B) |
| ≤ 6 | 19(C) | 34(D) | 53(C+D) |
| Total | 40(A+C) | 70(B+D) | 110 |

R.R = Rate in Exposed Person/Rate in Non-Exposed Person

A/A+B ÷ C+D/C ≅ Ad/Cb

R.R = 21x 34/19x36 =714/684 =1.04

### 3.3 Scabies in relation to house characteristics

The data classified by house characteristics is shown in Table 3. Using the standard epidemiological methods, the relative risk of cemented houses was estimated at 2.6. However, the difference in proportion of scabies cases in the two groups was not significant ($\chi^2$ =2.74; df=1; P>0.05).

**Table 3** Scabies in relation to house characteristics.

| House Characteristics | Case | Control | Total |
|---|---|---|---|
| Cemented | 8 | 6 | 14 |
| Uncemented | 32 | 64 | 96 |
| Total | 40 | 70 | 110 |

R. R=8x64/32x6=512/192=2.6

### 3.4 Scabies in relation tothe presence of domestic animals

The data were classified according tothe presence or absence of domestic animals at home (Table 4). The relative risk calculated is very small (0.88). Similarly a low $\chi^2$ value indicated no significant difference. ($\chi^2$ =0.67; df=1; P>0.05). Thus the result indicated that the disease and the factor are unassociated.

**Table 4** Scabies in relation tothe presence of domestic animals.

| Domestic Animals | Cases | Control | Total |
|---|---|---|---|
| Present | 11 | 21 | 32 |
| Absent | 29 | 49 | 78 |
| Total | 40 | 70 | 110 |

R. R=11x49/29x21=539/609=0.88

### 3.5 Scabies in relation to general health condition

The general health condition of school children did not appear to be an important risk factor in the prevalence of scabies. As the relative risk of poor health condition was only 1.87 (Table 5). $\chi^2$-test also indicated no significant difference in the prevalence rates in the two groups ($\chi^2$ =2.21; df=1; P>0.05).

**Table 5** Scabiesin relation to general health condition.

| Health Condition | Case | Control | Total |
|---|---|---|---|
| Poor | 17 | 20 | 37 |
| Good | 23 | 50 | 73 |
| Total | 40 | 70 | 110 |

R. R=17x50/23x20=850/480 =1.87

### 3.6 Scabies in relation to cleanliness

As personal hygiene is an important factor to overcome different diseases, so keeping this in mind Table 5 was constructed. In this case relative risk of poor condition of cleanliness was 1.10. The value of $\chi^2$ was non-significant ($\chi^2$ = 0.04; df = 1; p> 0.05) and the value of relative risk indicated a negative association between the factor and the disease.

**Table 6** Scabies in relation to cleanliness.

| Cleanliness | Case | Control | Total |
|---|---|---|---|
| Poor | 31 | 53 | 84 |
| Good | 09 | 17 | 26 |
| Total | 40 | 70 | 110 |

R. R=31x17/9x53 = 527/477 = 1.10

### 3.7 Scabies in relation with sleeping behavior

The data pertaining to the prevalence of scabies in relation to sleeping behavior is shown in Table 6. The data were classified into two categories: those who shared bedding and those who did not. Relative risk of bed sharing was found out to be 3.05. A high value of $\chi^2$ indicated a significant difference between the two groups

($\chi^2$ = 6.46; df=1; p<0.05). Thus sleeping behavior appeared to be an important factor in the prevalence of scabies.

**Table 7** Scabiesin relation to sleeping behavior.

| Bed Sharing | Case | Control | Total |
|---|---|---|---|
| Yes | 31 | 37 | 68 |
| No | 9 | 33 | 42 |
| Total | 40 | 70 | 110 |

R. R=31x33/9x37=1023/333=3.0

### 3.8 Scabies in relation to bathing frequency

To analyze the prevalence of scabies in relation to bathing frequency, the subject was divided into two categories: those who used to take bath once a week and those who took bath twice a week (Table 7). Relative risk of less frequent bathing was 1.39. a low value of$\chi^2$ indicated no significant difference ($\chi^2$ =0.008; df = 1; P>0.05).

**Table 8** Scabies in relation to bathing frequency.

| Bathing Frequency | Case | Control | Total |
|---|---|---|---|
| Once A Week | 13 | 18 | 31 |
| Twice A Week | 27 | 52 | 79 |
| Total | 40 | 70 | 110 |

R. R=13x52/27x18=676/486=1.39

### 3.9 Scabies in relation to frequency of changing of bed sheet

The data pertaining to the prevalence of scabies in relation to the frequency of changing to the bed sheet is shown in Table 8. Relative risk of less frequently changing bed sheet (once a month) was 0.90. Low value of$\chi^2$ indicated no significant difference ($\chi^2$ = 0.004; df = 1; p > 0.05). The factor and the disease were therefore not associated.

**Table 9** Scabies in relation tothe frequency of changing bed sheet.

| Frequency ofChanging Bed-Sheet | Case | Control | Total |
|---|---|---|---|
| Once A Month | 26 | 47 | 73 |
| Once A Week | 14 | 23 | 37 |
| Total | 40 | 70 | 110 |

R.R =26x23/14x47 =598/658 =0.90

### 3.10 Scabies in relation to exchange of clothing

The data were classified on the basis of exchange of clothing among the family member (Table 9). Relative risk of exchanging the clothes with the other family members was only 1.83. The low value of $\chi^2$ indicated no significant difference ($\chi^2$ =0.68; df = 1; p >0.05). Thus the risk of developing the disease for those with characteristics was not significantly greater than those without the characteristics.

**Table 10** Scabies in relation to exchange of clothing.

| Exchange Of Clothing | Case | Control | Total |
|---|---|---|---|
| Yes | 4 | 4 | 8 |
| No | 36 | 66 | 102 |
| Total | 40 | 70 | 110 |

R.R =4x66/36x4 =264/144 =1.83

### 3.11 Association between scabies and head-lice infestation

To analyze the association between scabies and head-lice infestation, the data were organized into 2x2 table (Table 10). The high value of $\chi^2$ indicated a significant association between scabies and head-lice infestation ($\chi^2$ =13.34; df =1; p< 0.001). An examination of the prevalence rates in the two groups indicated that the association was positive.

**Table 11** Association between scabies and head-lice infestation.

| | Scabies | | |
|---|---|---|---|
| Head-Lice | Present (Case) | Absent (Control) | Total |
| Present | 20 | 12 | 32 |
| Absent | 20 | 58 | 78 |
| Total | 40 | 70 | 110 |

$\chi^2$ = 13.34; Df =1; P < 0.001

The survey among school children was designed as a case-control study. The questionnaire used in the survey had 11 items but five of the items turned up to be not worth considering as epidemiological factors or they did not yield reliable responses. Such items were not included in the analysis of the data. The overall prevalence rate among school children was estimated at 4.13%.

## 4 Discussion

A significant difference between the percentage of infestation rates in the exposed and non-exposed groups, were used as a criteria to identify the factors of epidemiological significance. Only two, out of a total of 10 variables assessed as possible risk factor, emerged as having some epidemiological significance. They included bed sharing and presence of head-lice infestation. The above mentioned procedure was adapted on the basics of management of relative risk as well. Our observation concerning bed sharing as a risk factor is in agreement with Hassan et al. (1979), who reported that most of the infected children shared the bed with other family member. Similarly 65.5% of scabetic had infected sister or brother. Likewise, Schenone et al. (1971) also emphasized the importance of sharing of beds by children in the spread of scabies.

Second important risk factor of an epidemiological significance was the presence of head lice infestation. Our data indicated a significant positive association between the two conditions. The present study is apparently the first one to demonstrate a significant association between the two conditions. Chosidow (2000) reported that the association between the scabies and pediculosis is not yet found and difficulties in management have returned both of them to lime light. Both scabies and pediculosis are ubiquitous, contagious and debilitating parasitic dermatoses.

The present study indicated that most of the children with scabies complaint of itching. Of the cases 55% reported itching during night, 35% suffered itching only during both the day and night and 10% of cases reported itching only during the day. Sharma et al. (1984) also reported that in India 69.5% of case complaint of itching during night, 26.3% during both day and night 2.8% complaint of itching only during the day.

For the proper eradication it is important to treat all close contacts, they can remain asymptomatic for as long as 8 weeks after the infestation and so can spread the disease unknowingly (Association for Consumer Research, 1988). The cream or the lotion is applied to all skin surface below the neck and the face in children. Patients with relapsing scabies and elderly should be treated from head (including the scalp) to toe. One ounce is adequate for adults. Re-apply the medicine to the hands if the hands are washed. The nails should be cut short and medication applied under them vigorously with a toothbrush. Infants should have lindane applied during the day and be fully clothed and be observed to prevent licking of treated sites. If the licking cannot be prevented sulfur or permethrin should be used. Adults should wash 12hours after application. One application of either medicine is considered adequate.

Patients should be told that it is normal to continue to itch for days or weeks after treatment and that further application of medication is usually not necessary and worsens itching by causing irritation. Bland lubrication may be applied to relief itching (Habif, 1996).

Considering prevention, basic recommendations for improving hygiene (promotion of use of soap, of water for washing, of better household hygiene) would probably benefit certain disorders (e.g. pyoderma). Providing intensive education programmes aimed at changing standard hygiene practices) which seem necessary to obtain a significant impact; if these associated measures are lacking, the range of impact of such basic recommendations appears largely unknown. Nevertheless, improving the socioeconomic level of large populations would certainly benefit these disorders, as well as reduce other health problems that are related to poverty.

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